NAVSHIPS 93285(B)

(Non-Registered)

VOLUME 2

OPERATOR'S MANUAL

for

RADIO SET AN/URC-32 SERIES

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

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SECTION 3

OPERATION

3-1. FUNCTIONAL OPERATION.

Radio Sets AN/URC-32( ) are manually operated transceivers used in the 2- to 30-mc range which can transmit or receive on channels in this range spaced 1 kc or 0.1 kc apart. Four r-f bands are used: band 1, 2.0 to 3.7 mc; band 2, 3.7 to 7.7 mc; band 3, 7.7 mc to 15.7 mc; and band 4, 15.7 mc to 30.0 mc. The transceivers (AN/URC-32( )) use common tuned circuits and common injection signals for both transmit and receive operation. The transceivers employ superheterodyning principles with double-conversion and two intermediate frequencies: one fixed at 300 kc and the other variable from 1.7 to 3.7 mc. Double conversion is used when operation is in either band 2, 3, or 4; single conversion is used in band 1.

The transceivers are capable of operating in any of the following modes: CW telegraph (A1), double-sideband full carrier (A3) on receive, carrier and USB on transmit (A3-compatible), single-sideband reduced carrier (A3a), independent sideband on reduced carrier (A3b), single-sideband suppressed carrier (A3J), composite transmission (A9), and FSK (F1). The transceivers normally are used for single-sideband suppressed carrier, CW, or FSK. When simultaneous independent-sideband transmission or reception is desired, the proper audio input and output connections must be made (refer to paragraph 2-6b(2)).

The transceivers are tuned manually at the equipment rack. Each contains a dynamic handset (H-169/U) with a push-to-talk switch so that unit can be keyed locally. However, in normal use, the transceivers are supplied audio signals for transmission from a remote point; during receive, detected audio signals are routed to this remote point.

During transmit, audio signals from the handset adapter (C-2691/URC) or from remote lines are routed through either the USB or LSB circuits (depending on operator's control settings) of the audio and control unit (AM-2062( )/URC) to the sideband generator (AM-2064/URC). The signal is then converted to a fixed 300-kc intermediate frequency and relayed to the frequency amplifier (CV-731/URC). The 300-kc i-f signal is converted in the frequency amplifier to any desired 1-kc or 0.1-kc operating frequency in the 2- to 30-mc range, amplified, and routed to the power amplifier (AM-2061/URT). The r-f signal is amplified to 500 watts in the power amplifier and relayed to the antenna (via an accessory antenna coupling device). During receive operation, the process is essentially the reverse of that described for transmit; the resulting a-f signals are routed to the dynamic handset and the remote audio lines.

Specific modes and methods of operation are given in paragraphs 3-2 and 3-4.

3-2. OPERATING PROCEDURES.

The operating controls, sequence of operation, tuning, and summary of operation for Radio Set AN/URC-32( ) are given in the following paragraphs. Illustrative material is included as an aid to understanding as well as relating the text to the equipment more clearly.

a. DESCRIPTION OF CONTROLS. - The operating controls and a functional description of each are given in table 3-1. The table is divided into eight sections, one for each of the basic functional units containing operating controls.

TABLE 3-1. DESCRIPTION OF OPERATING CONTROLS AND INDICATORS FOR RADIO SET AN/URC-32( )

UNIT	CONTROL OR INDICATOR	FUNCTION
Radio Frequency Amplifier AM-2061/URT (See figures 1-1, 1-2, and 3-1.) (Cont)	PL NO. 1 TEST switch	Used to disconnect V3 while checking tube balance.
	PL NO. 2 TEST switch	Used to disconnect V4 while checking tube balance.
	FIL OFF-TUNE-OPERATE switch	
	FIL OFF position	Disables filament and bias supplies for V1, V2, V3, and V4.

TABLE 3-1. (Continued)

UNIT	CONTROL OR INDICATOR	FUNCTION
Radio Frequency AMplifier AM-2061/URT (See figures 1-1, 1-2, and 3-1.) (Cont)	TUNE position	Reduces driver plate and screen-grid voltages and power amplifier screen-grid voltages.
	OPERATE position	Supplies normal voltages to driver and amplifier stages.
	PLATE switch	
	OFF position	Disables high-voltage power supply (PP-2153/U).
	ON position	Enables high-voltage power supply.
	KEY position	Enables high-voltage supply and keys set to transmit.
	PLATE lamp	Indicates 2000-volt B+ is applied to plates of V3 and V4.
	6.0 VAC TEST POINT	Test point to measure filament voltage for V1 through V4.
	Band switch	Selects one of four frequency bands. Band 1 . . . . . 2.0 to 3.7 mc Band 2 . . . . . 3.7 to 7.7 mc Band 3 . . . . . 7.7 to 15.7 mc Band 4 . . . . . 15.7 to 30.0 mc
	DRIVER TUNE control	Used to tune inductor in plate circuit of V1, V2.
	PA TUNE control	Used to tune inductor in plate circuit of V3, V4.
Converter-Oscillator CV-731/URC (See figures 1-1, 1-3 and 3-1.) (Cont)	OPERATE-TUNE switch	In TUNE position, disables stabilized master oscillator (SMO) feedback circuit to prevent oscillator locking on spurious frequency.
	BAND CHANGE switch	Selects operating frequency band.
	FREQUENCY CHANGE control	Selects 1 kc operating frequency (selected frequency appears on direct-readout counter under lighted band indicator lamp).
	DIAL LOCK	Locks frequency counter dials and tuning controls for 1 kc tuning at the position of the selected frequency.
	0.1KC TUNE control	After 1 kc channel has been selected, used to select a 0.1-kc operating frequency.

TABLE 3-1. (Continued)

UNIT	CONTROL OR INDICATOR	FUNCTION
Converter-Oscillator CV-731/URC (See figures 1-1, 1-3 and 3-1.) (Cont)	AFC meter	Indicates amount of correction applied to main oscillator from SMO.
	Band indicating lamp (4)	Light over dial of frequency band selected.
Amplifier-Converter-Modulator AM-2064/URC (See figures 1-1, 1-4, and 3-1.) (Cont)	SSB-AM switch	Selects single-sideband or AM (carrier reinserted) mode of operation.
	RECEIVER RF GAIN control	Controls r-f and i-f gain of receive circuits.
	TUNE-LOCAL-EXTERNAL CONTROL switch	
	TUNE position	A calibrated carrier is reinserted for tuning, and audio input signals are disconnected.
	LOCAL position	Position for normal operation.
	EXTERNAL CONTROL position	Used when a remote receiver r-f gain, AGC-TGC (transmitter gain control or automatic gain control), and SSB-AM switch are used.
	Meter	Monitors function selected by meter switch.
	Meter switch	
	90 position	Measures -90 volts dc bias used for receiver and exciter r-f gain.
	+130 position	Measures +130 volts dc used on plates and screen grids of tubes in the sideband generator and plates of tubes in the frequency selector.
	+250 position	Measures +250 volts dc used during transmit by the r-f tuner in the frequency generator.
	AGC-TGC position	Measures tgc (transmitter gain) and agc (automatic gain control).
	RF OUT EXCITER position	Monitors the r-f output of the exciter (0.15 watt PEP).
	EXCITER RF GAIN control	Adjusts r-f gain of amplifiers in frequency generator and i-f gain of amplifiers in sideband generator.

TABLE 3-1. (Continued)

UNIT	CONTROL OR INDICATOR	FUNCTION
Amplifier-Converter-Modulator AM-2064/URC (See figure 1-1, 1-4, and 3-1.) (Cont)	SIDETONE switch (under dust cover)	
	OFF position	Disables sidetone.
	ON position	Routes a portion of the audio signal being transmitted, to receive audio circuits.
Converter-Monitor CV-730/URC (See figures 1-1, 1-5 and 3-1.) (Cont)	METER MULTR switch	Selects either 0 DBM or +8 DBM multiplier for VU METER.
	XMIT-REC-CW TEST switch	
	XMIT position	Keys transceiver to transmit.
	REC position	Normal switch position for receive operation.
	CW TEST position (momentary, spring return to REC position)	Used to check CW operation.
	MONITOR switch	
	OFF position	Disconnects VU METER.
	LSB XMIT or REC positions	Connects VU METER to measure dbm level of lower-sideband transmit or receive audio signals.
	USB XMIT or REC positions	Connects VU METER to measure dbm level of upper-sideband transmit or receive audio signals.
	BFO (beat frequency oscillator) switch	In FSK (frequency shift keying), receive operation used to vary center bfo frequency (300.550 kc) plus or minus 1 kc.
	OSC CONTROL switch	
	OFF position	Disconnects active circuits and connects CW and FSK key to main key line.
	FSK position	Connects +130 volts dc to plates of oscillator and amplifier, audio output of unit to sideband generator (via USB transmit line), teletypewriter input to oscillator, and unit key line to main key line. Disconnects USB transmit audio routed from audio and control unit (AM-2062( )/URC).

TABLE 3-1. (Continued)

UNIT	CONTROL OR INDICATOR	FUNCTION
Converter-Monitor CV-730/URC (See figures 1-1, 1-5 and 3-1.) (Cont)	CW 1KC position	Connects +130 volts dc to plates of oscillator and amplifier, oscillator for 1 kc output, unit key line to CW TEST position of XMIT-REC CW TEST switch, and audio output of unit to sideband generator (via USB transmit line). Disconnects USB transmit audio routed from audio and control unit (AM-2062( )/URC).
	CW 1.5KC position	Same as CW 1KC position except that oscillator is connected for 1.5-kc output.
	OUTPUT control	Adjusts level of audio output signal.
	OSC ON lamp	Indicates CW and FSK unit is operating.
	XMIT lamp	Indicates AN/URC-32( ) is keyed to transmit.
	VU METER	Monitors transmit audio inputs to frequency generator (CV-731/URC) and receive audio outputs of audio and control unit (AM-2062( )/URC) as selected by MONITOR switch. Readings are used for tuning and FSK operation when a single tone (sine wave) is used. (On single tone, vu and dbm readings are equal.)
	KEYING RELEASE TIME CONTROL (under dust cover)	Adjusts release time of CW keying circuit.
Amplifier-Control AM-2062( )/URC (See figures 1-1, 1-6, and 3-1.)	MIC GAIN control	Adjusts gain of audio inputs to unit.
	SIDEBAND SELECTOR switch	
	LOCAL-OFF position	Connects 600-ohm balanced audio inputs and outputs (telephone lines) to AN/URC-32( ) audio channels.
	LSB position	Connects PHONES jack, speaker output, and handset adapter (C-2691/URC) to AN/URC-32( ) LSB audio channel. Disconnects 600-ohm balanced LSB audio input and output.
	USB position	Same type of connections and disconnections (made as in LSB position but for USB).
	PHONES jack	Output jack for standard headphones.

TABLE 3-1. (Continued)

UNIT	CONTROL OR INDICATION	FUNCTION
Signal Comparator CM-126/UR (See figures 1-1, 1-7, and 3-1.)	GAIN control	Adjusts the gain of signal from the LSB audio channel or the 100-kc external standard.
	METER ZERO control	Adjusts voltage applied to meter for zeroing.
	FREQUENCY SELECTOR switch	
	OFF position	Disconnects all inputs and shorts meter.
	100 KC position	Connects 100-kc signal from frequency generator (CV-731/URC) and 100-kc signal from external standard to V2 (mixer tube).
	1 KC position	Connects a 1-kc signal from frequency generator and LSB receive audio signal from sideband generator (AM-2064/URC) to V2 and inserts output of V2 into LSB receive audio channel to audio and control unit (AM-2062( )/URC).
	Meter	Oscillates at a frequency equal to the difference of frequencies being compared in V2.
Control-Power Supply C-2691/URC (See figures 1-1, 1-8, and 3-1.)	HANDSET jack	Connection for Dynamic Handset H-169/U.
	HANDSET switch	Selects LOCAL or REMOTE audio input, audio output, and key line.
Dynamic Handset H-169/U (See figures 1-1, 1-9, and 3-1.)	Push-to-talk switch	Keys transceiver to transmit.
Power Supply PP-2154/U (See figures 1-1, 1-10, and 3-1.)	OFF-ON switch	Controls power supplied to low-voltage power supply and Electronic Equipment Air Cooler HD-347/U (see figures 1-1, 1-11, and 3-1).
	Indicator	Lights when power supply is operative.

b. SEQUENCE OF OPERATION. - Radio Sets AN/URC-32( ) are capable of operating in one of several modes: CW, FSK, SSB, and AM (carrier reinsertion). The following paragraphs describe the procedures for operation in each of these modes and the preliminary settings required.

(1) TURNING ON EQUIPMENT. - Procedures for initial turn-on and preliminary adjustment are given in section 2, paragraph 2-6; connections for specific types of operation are given in paragraph 2-4i.

(2) GENERAL PRELIMINARY SETTINGS. - The following settings are to be made before operation in any mode is attempted (refer to figures 1-1 and 3-1).

(a) On power amplifier (AM-2061/URT), set FIL OFF-TUNE-OPERATE switch to FIL OFF and PLATE switch to OFF.

(b) On sideband generator (AM-2064/URC), set RECEIVER RF GAIN counterclockwise, EXCITER RF GAIN counterclockwise, and TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL.

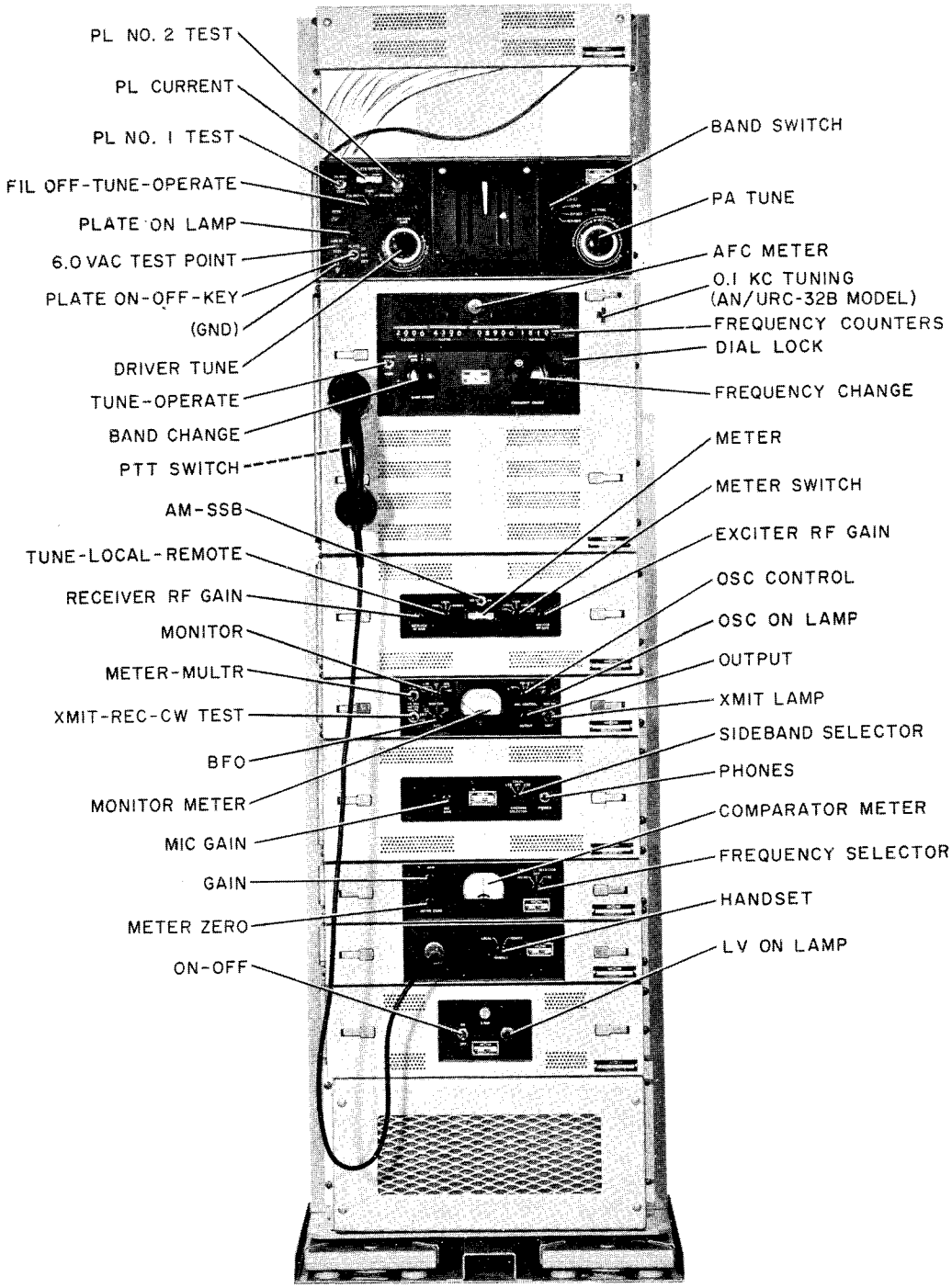

Figure 3-1. Radio Set AN/URC-32( ), Operating Controls and Indicators

(c) On frequency comparator (CM-126/UR) set FREQUENCY SELECTOR to OFF.

(d) On CW and FSK unit (CV-730/URC) set XMIT-REC-CW TEST to REC and OSC CONTROL to OFF.

(e) On audio and control unit (AM-2062( )/URC), set SIDEBAND SELECTOR to LOCAL-OFF.

(3) SELECTING OPERATING FREQUENCY. - Use the following procedure to select operating frequencies on the AN/URC-32( ).

(a) Set PLATE switch on power amplifier (AM-2061/URT) to OFF.

(b) Set BAND CHANGE switch on frequency generator (CV-731/URC) to band which includes desired operating frequency (band 1, 2.0 to

3.7 mc; band 2, 3.7 to 7.7 mc; band 3, 7.7 to 15.7 mc; or band 4, 15.7 to 30.0 mc).

(c) Release DIAL LOCK on frequency generator, and set 1-kc operating frequency on lighted frequency counter using the FREQUENCY CHANGE control. When selecting a frequency which is not on the band 7.7- to 15.7-mc or 15.7- to 30.0-mc frequency counters, set the frequency counter to the next lower frequency, and set the BAND CHANGE switch to ADD 1, ADD 2, or ADD 3. When the desired operating frequency is on the frequency counter, set the BAND CHANGE switch to ADD 0. To select an operating frequency of 23.699 mc, set the BAND CHANGE switch to BAND 4, set the 15.7- to 30.0-mc frequency counter to 23.696 mc using the FREQUENCY CHANGE control, and reset the BAND CHANGE switch to BAND 4 ADD 3.

Note

When setting up a frequency on any band, make certain the white index line on the last dial of the 15.7- to 30.0-mc frequency counter is centered in the window.

(d) Reset DIAL LOCK, and momentarily depress OPERATE-TUNE switch on frequency generator (this action prevents oscillator locking on spurious signals). See paragraph 3-2d for tuning adjustment procedures.

(e) To select a 0.1-kc operating frequency (AN/URC-32B models) adjust 0.1KC TUNE control (see figure 3-1) to desired frequency.

Note

If operating frequency is to be 1 kc, set 0.1KC TUNE control to zero.

(4) VOICE OPERATION. - To communicate by voice from either local or remote positions, use the following procedure.

Note

Power turn-on is done at the equipment rack and the transceiver is on continuously. An indicator on the remote control unit lights when power is applied.

(a) Make the general preliminary settings described in paragraph 3-2b(2) and tuning adjustments in paragraph 3-2d.

(b) Set SSB-AM switch on the sideband generator (AM-2064/URC) to desired position.

(c) Set OSC CONTROL switch on CW and FSK unit (CV-730/URC) to OFF.

(d) Using the settings of table 3-2, select settings of SIDEBAND SELECTOR switch (on AM-2062( )/URC) and HANDSET switch (on C-2691/URC) for desired audio source.

(e) To transmit, key transmitter by depressing push-to-talk switch on local dynamic handset (H-169/U) or remote keying device.

(f) During receive, if speaker, dynamic handset, or remote audio output level is not adequate, adjust SPEAKER GAIN control (under dust cover of AM-2062( )/URC) for desired level.

(5) TELETYPEWRITER FSK OPERATION. - The following is used for communicating by FSK with the AN/URC-32( ).

(a) Make the general preliminary settings described in paragraph 3-2b(2) and tuning adjustments of paragraph 3-2d.

(b) Set SSB-AM switch on the sideband generator (AM-2064/URC) to SSB.

(c) Set SIDETONE switch (under dust cover) to OFF.

(d) Set OSC CONTROL switch on the CW and FSK unit (CV-730/URC) to FSK.

(e) Set OUTPUT control to maximum counterclockwise position and BFO control to center mark.

(f) Set SIDEBAND SELECTOR switch on audio and control unit (AM-2062( )/URC) to USB.

(g) Set HANDSET switch on handset adapter (C-2691/URC) to REMOTE.

(h) Set the CV-731/URC frequency counter dial 2 kc below the assigned operating frequency. Refer to table 3-3 for typical examples.

(i) Adjust BFO control and CW and FSK unit for proper operation of FSK converter.

(6) CW OPERATION. - The following procedure is used for communicating by CW with the AN/URC-32( ).

(a) Make the general preliminary settings described in paragraph 3-3b(2) and the tuning adjustments described in paragraph 3-2d.

(b) Set SSB-AM switch on sideband generator (AM-2064/URC) to SSB.

(c) Set SIDETONE switch (under dust cover) to ON.

(d) Set OUTPUT control on CW and FSK unit (CV-730/URC) to maximum counterclockwise position.

(e) Set SIDEBAND SELECTOR switch on audio and control unit (AM-2062( )/URC) to USB.

(f) Set HANDSET switch on handset adapter (C-2691/URC) to REMOTE.

(g) Set the CV-731/URC frequency counter dial 1 kc below the assigned operating frequency and the CW and FSK unit (CV-730/URC) OSC CONTROL switch to CW 1KC. (When the assigned operating frequency is ±0.5 kc from the nearest frequency obtainable on the counter, set the counter 1.5 kc below assigned frequency and CV-730/URC OSC CONTROL to CW 1.5KC.) Refer to table 3-3 for typical examples.

c. INDICATOR PRESENTATIONS. - Normal meter indications for the AN/URC-32( ) during transmit for SSB voice, AM voice, CW, and FSK operation are shown in table 3-4; meter readings for

TABLE 3-2. CONTROL SETTINGS FOR VOICE OPERATION

AUDIO SOURCE	MODE OF OPERATION	SIDEBAND SELECTOR SWITCH (ON AM-2062( )/URC)	HANDSET SWITCH (ON C-2691/URC)
USB and LSB balanced lines	USB and LSB	LOCAL OFF	Either LOCAL or REMOTE
USB 600-ohm balanced lines	USB	LOCAL OFF or LSB	Either LOCAL or REMOTE
	AM	LOCAL OFF or LSB	Either LOCAL or REMOTE
LSB 600-ohm balanced lines	LSB	LOCAL OFF or USB	Either LOCAL or REMOTE
Local dynamic handset	USB	USB	LOCAL
	LSB	LSB	LOCAL
	AM	USB	LOCAL
Remote dynamic handset	USB	USB	REMOTE
	LSB	LSB	REMOTE
	AM	USB	REMOTE

TABLE 3-3. EXAMPLES OF SELECTING CW OR FSK OPERATING FREQUENCIES

MODE OF OPERATION	ASSIGNED FREQUENCY (mc)	FREQUENCY COUNTER (ON CV-731/URC) (mc)	BAND CHANGE SWITCH (ON CV-731/URC)		OSC CONTROL SWITCH (ON CV-730/URC)
			BAND	ADD	
CW	3.194	3.1930	1	0	CW 1KC
CW	2.9285	2.9270	1	0	CW 1.5KC
CW	8.240	8.2380	3	1	CW 1KC
CW	9.2625	9.2600	3	1	CW 1.5KC
FSK	3.194	3.1920	1	0	FSK
FSK	8.315	8.3120	3	1	FSK

-90, +130, and +250 d-c voltages and vu are the same during receive and transmit operation.

d. TUNING PROCEDURE AND ADJUSTMENTS. - The set is tuned manually using the procedures given below. There are two tuning procedures, one for the receiver portion and the other for the transmitter portion. These procedures should be performed whenever a new operating frequency is selected.

(1) RECEIVER TUNING. - Refer to figure 3-1. The following tuning procedure is used whenever the transceivers (AN/URC-32( )) are set to a new operation frequency:

(a) Set PLATE switch on Radio Frequency Amplifier AM-2061/URT to OFF.

(b) Set BAND CHANGE switch on Converter-Oscillator CV-731/URC to the desired frequency band. The band indicator lamp will light

TABLE 3-4. NORMAL METER READINGS ON RADIO SET AN/URC-32( ) DURING TRANSMIT OPERATION

METER READING	AM VOICE		SSB VOICE		CW (KEY CLOSED) OR FSK
	NO MODULATION	PEAK MODULATION	NO MODULATION	PEAK MODULATION	
TGC	0	Within red line	0	Within red line	---
RF OUT	10 db	20 db	0	20 db	20 db
PLATE CURRENT	290-305 ma	200-400 ma	150 ma	400 ma	550 ma
-90	Midscale	Midscale	Midscale	Midscale	Midscale
+130	Midscale	Midscale	Midscale	Midscale	Midscale
+250	Midscale	Midscale	Midscale	Midscale	Midscale
VU (+8 dbm)		(Must vary)		(Must vary)	Ovu
Power	125 watts	400 watts	0	400 watts	500 watts
Reflected power	Less than 3 watts	Less than 10 watts	0	Less than 10 watts	Less than 10 watts

over the selected frequency counter. Radio Set AN/URC-32( ) frequency bands are as follows:

Band 1 . . . . . 2.0 to 3.7 mc.
Band 2 . . . . . 3.7 to 7.7 mc.
Band 3 . . . . . 7.7 to 15.7 mc.
Band 4 . . . . . 15.7 to 30.0 mc.

(c) Release DIAL LOCK on Converter Oscillator CV-731/URC. Set the desired operating frequency on the lighted frequency counter using the FREQUENCY CHANGE control. When selecting a frequency which is not on the band 7.7- to 15.7-mc or 15.7- to 30.0-mc frequency counters, set the frequency counter to the next lower frequency, and set the BAND CHANGE switch to ADD 1, ADD 2, or ADD 3. When the desired operating frequency is on the frequency counter, set the BAND CHANGE switch to ADD 0.

For example, to select an operating frequency of 23.699 mc, set the BAND CHANGE switch to BAND 4, set the 15.7- to 30.0-mc frequency counter to 23.696 mc using the FREQUENCY CHANGE control, and reset the BAND CHANGE switch to BAND 4 ADD 3. See table 3-3 for setting of CW and FSK frequencies.

Note

When setting up a frequency on any band, make certain the white index line on the last dial of the 15.7- to 30.0-mc frequency counter dial is centered in the window.

(d) Reset DIAL LOCK, and momentarily depress the OPERATE-TUNE switch on the Converter Oscillator CV-731/URC to TUNE. This prevents the stabilized master oscillator (SMO) from locking on spurious signals. The AFC meter shows the amount of correction being supplied to the master oscillator (MO) from the stabilization circuits and should not be expected to read 0 unless the master oscillator is exactly on frequency and no correction is required.

(e) Adjust RECEIVER RF GAIN control so that the agc does not increase the gain excessively between characters in CW and FSK or between words in single-sideband voice reception. The RECEIVER RF GAIN gain control normally is set so that the sideband generator (AM-2064/URC) meter (agc) momentarily indicates about 15 db with the meter switch in the AGC-TGC position. If speaker, dynamic handset, or remote audio output level is not adequate, set SPEAKER GAIN control (under the dust cover of the Amplifier-Control AM-2062( )/URC) for the desired output level. On FSK operation, adjust BFO control for proper operation of FSK converter. This completes the tuning of the receiver portion of Radio Set AN/URC-32( ).

(2) TRANSMITTER TUNING. - Refer to figure 3-1. Perform the receiver tuning procedures before attempting to tune the transmitter portion.

CAUTION

Before attempting transmitter tuning, be sure the transceiver is connected to an antenna system containing an antenna tuner, such as the Antenna Coupler Group AN/SRA-22 or Coupler Monitor CU-737/URC, and Electrical Dummy Load DA-218/U. If the CU-737/URC and an antenna tuner such as the AN/BRA-3, AN/BRA-5, AN/BRA-13, AN/BRA-17, or AN/SRA-18, is used, set the antenna tuner power switch to ON and the bypass switch to OFF (ready light must be on). If this is not done interlocks will prevent operation of Radio Frequency Amplifier AM-2061/URT.

(a) Set ANT-LOAD switch on the AN/SRA-22 or CU-737/URC to LOAD, FIL OFF-TUNE-OPERATE switch on power amplifier to TUNE, meter selector switch on sideband generator to RF OUT EXCITER, and TUNE-LOCAL-EXTERNAL CONTROL switch on sideband generator to TUNE.

Note

In the following steps, key to transmit by depressing the PLATE switch on power amplifier to KEY.

(b) With the EXCITER RF GAIN control in the maximum counterclockwise position, key to transmit and turn EXCITER RF GAIN control clockwise until meter on sideband generator reads approximately 40 db.

(c) Key to transmit and adjust DRIVER TUNE control on power amplifier (within the desired band limits (refer to figure 3-2)) to peak the PLATE CURRENT meter reading; adjust the EXCITER RF GAIN control as necessary to maintain a PLATE CURRENT meter reading of approximately 200 ma. The red index on the DRIVER TUNE control must fall within the proper band limits marked on the panel to prevent tuning on harmonics. If a power output reading is observed on the power output meter of the antenna tuner, detune the PA TUNE control until no power output is indicated. This effectively disables the r-f feedback so that optimum adjustment of the driver plate circuit can be obtained. Reducing EXCITER RF GAIN control for a decrease in PLATE CURRENT meter reading, as necessary, will result in a sharper indication of driver tuning.

Note

After completing step (c), make no further adjustments on the DRIVER TUNE control for the remainder of the tuning procedure.

(d) Set the PA TUNE control on power amplifier within the desired frequency band limits.

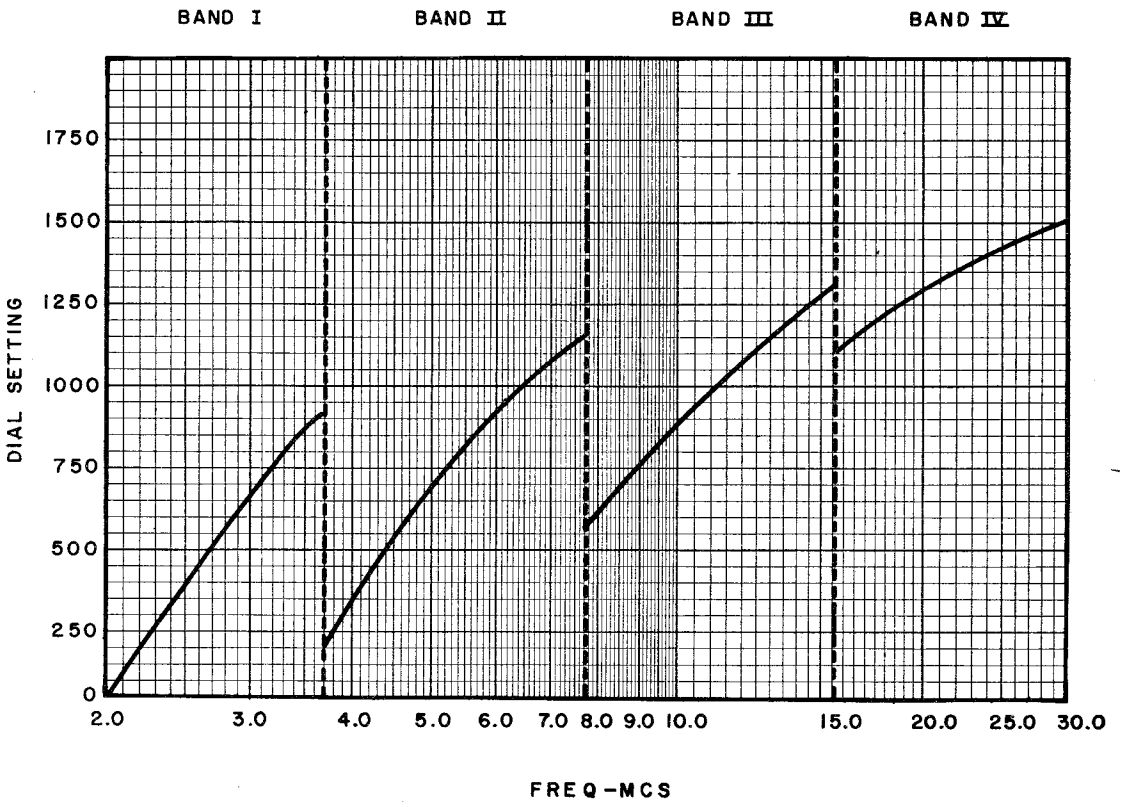

Figure 3-2. Calibration Curve for DRIVER TUNE Control on AM-2061/URT

(Refer to figure 3-3). Key to transmit and adjust PA TUNE control for a dip in the PLATE CURRENT meter reading.

(e) Set EXCITER RF GAIN control maximum counterclockwise and FIL OFF-TUNE-OPERATE switch on power amplifier to OPERATE.

(f) Key to transmit, turn EXCITER RF GAIN control clockwise until 500 watts of forward power is indicated, and redip PLATE CURRENT meter reading using the PA TUNE control (meter reading should not exceed 500 ma). Release the key switch.

CAUTION

Do not operate ANT-LOAD switch while AN/URC-32( ) is keyed to transmit.

(g) Set FIL OFF-TUNE-OPERATE switch on the power amplifier to TUNE ANT-LOAD switch on antenna tuner control to ANT, and adjust antenna tuner controls for minimum reflected power. (For this procedure, see the operating procedures in the antenna tuner control technical manual.)

(h) Set FIL OFF-TUNE-OPERATE switch to OPERATE. Key to transmit, and adjust EXCITER RF GAIN control for a forward power output meter reading of 500 watts. (The reflected power meter reading should be less than 10 watts and PLATE CURRENT meter reading between 450 and 550 ma).

(i) Key to transmit, and adjust the EXCITER RF GAIN control for a forward power output of 125 watts.

Note

Leave EXCITER RF GAIN control set at this position for voice operation. (For AM, see step (k).)

(j) Key to transmit and check for the following meter readings:

PLATE CURRENT meter . approximately 300 ma.
Forward power output . . . 125 watts
Reflected power . . . . . less than 3 watts
RF OUT meter . . . . . 10 to 20 db
TGC . . . . . no meter indication

(k) Set TUNE-LOCAL-EXTERNAL CONTROL switch on sideband generator to LOCAL. (On AM transmit operation, set the SSB-AM switch to AM.) Set PLATE switch on power amplifier to ON. This completes the tuning procedure.

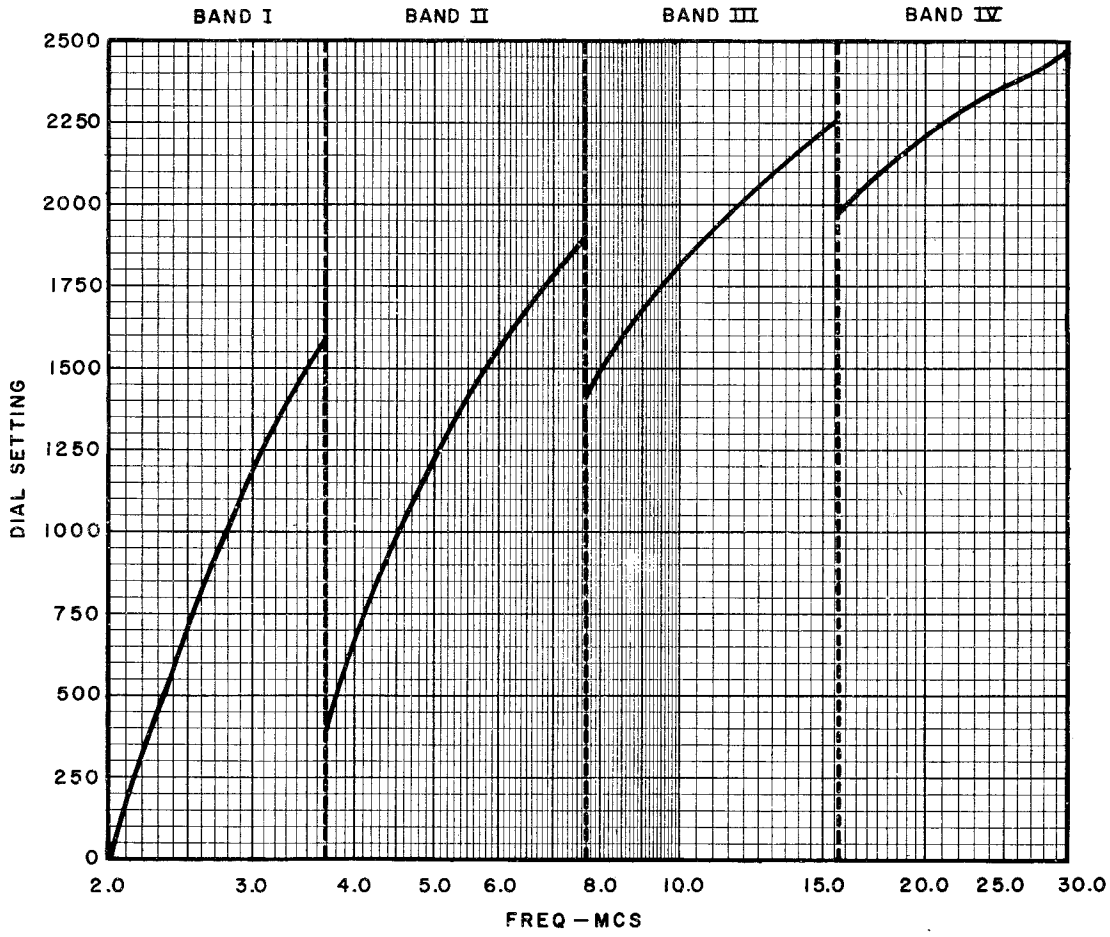

Figure 3-3. Calibration Curve for PA TUNE Control on AM-2061/URT

3-3. SUMMARY OF OPERATING PROCEDURES.

A summary of operating procedures for the AN/URC-32( ) is contained in table 3-5.

3-4. EMERGENCY OPERATION.

During emergency or battle conditions, should equipment become affected, use the following procedures:

a. OTHER THAN NORMAL.

(1) DAMAGE TO TRANSMITTER SECTION. - Should Radio Frequency Amplifier AM-2061/URT or Power Supply PP-2153/U be damaged, it may still be possible to receive at normal capability and transmit at reduced power. Attempt to key the set and contact a distant operator; if this fails, determine if reception is still possible.

(2) DAMAGE TO CW OR FSK FUNCTIONS. - When Converter-Monitor CV-730/URC is affected, switch to voice operation and contact sender (or receiving operator) to see if information can be relayed in this manner.

b. JAMMING. - When it appears that communication is being jammed, attempt to switch to another frequency band.

3-5. OPERATOR'S MAINTENANCE.

a. OPERATING CHECKS. - Periodically, the following checks should be made to ensure proper operation:

(1) METER READINGS. - Table 3-4 lists the normal meter readings for transmit operation (the -90, +130, and +250 readings are the same on receive and transmit).

(2) STABILIZED MASTER OSCILLATOR (SMO) CHECK. - The AFC meter on the front panel of the CV-731/URC provides a visual means of checking for stabilizing loop correction. The deflection of the meter is proportional to the frequency correction of the master oscillator (MO) by the SMO stabilizing loop. The following checks may be performed with the receive operation:

(a) Check the AFC meter reading; reading of greater than ±90 ua indicates possible faulty operation of the SMO. If the AFC meter reading is zero on all frequencies, the stabilizing loop is not correcting the master oscillator or the meter circuit is defective. Use the following AFC meter limits for indication of faulty operation:

BAND 1 FREQUENCY	MAXIMUM AFC
Up to 2.0 mc	90 ua
2.0 to 2.5 mc	80 ua
2.5 to 3.0 mc	70 ua
3.0 to 3.7 mc	50 ua

Note

Refer to band 1 dial reading for AFC meter reading. This applies no matter on which band the transceiver (AN/URC-32( )) may be operating.

(b) Depress the OPERATE-TUNE switch to TUNE, and check that the AFC meter reading goes to approximately zero. When the OPERATE-TUNE switch is released to OPERATE, the AFC meter reading should return to the original reading.

(c) Set the BAND CHANGE switch from BAND 3 ADD 0 to BAND 3 ADD 1, and check that the AFC meter reading is deflected about one division. A deflection of about one half a division should be observed when switching between ADD 0, ADD 1, ADD 2, and ADD 3, on BAND 4. The deflection is an indication of a change in the master oscillator frequency.

b. OPERATING ADJUSTMENTS.

(1) TRANSMIT AUDIO LEVEL ADJUSTMENTS.

(a) VOICE OPERATION WITH DYNAMIC HANDSET H-169/U.

1. Set EXCITER RF GAIN control on AM-2064/URC for 125 watts r-f output in tune condition.

2. Set meter switch to AGC-TGC position.

3. Depress push-to-talk switch on dynamic handset, and while speaking at a normal level, adjust MIC GAIN control on AM-2062( )/URC so that meter on AM-2064/URC peaks in red section of scale.

(b) CW AND FSK OPERATION.

1. Set METER MULTR switch on CV-730/URC to +8 DBM position.

2. Set MONITOR switch to USB XMIT position.

3. Depress XMIT-REC-CW TEST switch to CW TEST or XMIT position, and adjust OUTPUT control for a 0 vu reading on the VU METER.

4. Adjust EXCITER RF GAIN control on AM-2064/URC for 500 watts output.

(2) CW BREAK-IN ADJUSTMENT. - The CW and FSK unit (CV-730/URC) contains a keying circuit which keys the set to transmit whenever the CW key is closed. This keying circuit has a delay which holds the AN/URC-32( ) equipment in transmit between normal key-open intervals during CW transmissions. This delay time is adjusted when the equipment is installed. If desired, the keying release time may be changed by adjusting R18 CW KEYING RELEASE TIME adjustment located under the dust cover of the unit (see figure 5-59). This adjustment should be set so the transceiver remains keyed to transmit during normal CW key operation. This can be checked by operating the CW key at the normal rate and checking to see that the XMIT light on CV-730/URC remains lighted. If the antenna tuner being used has a tuner bypass feature, set the bypass switch to tuner-in. This will reduce the transmit keying lag and prevent part of the first character from being lost.

(3) CALIBRATION OF RADIO FREQUENCY AMPLIFIER AM-2061/URT. - Periodically, the DRIVER TUNE and PA TUNE controls on the AM-2061/URT should be checked for calibration. Figures 3-2 and 3-3 are charts used for this calibration check.

Figure 3-2 is a chart for the DRIVER TUNE control; the chart is divided into four sections, one for each frequency band. Each band has a unique curve showing the relationship of the dial setting to the frequencies of the band. Figure 3-3 is a similar chart for the PA TUNE control. Occasionally, a check should be made in each band with each control to determine if dial settings are proper for the operating frequency in use.

(4) FREQUENCY CALIBRATION CHECK OF RADIO SET AN/URC-32( ).

(a) CALIBRATION CHECK USING SIGNAL COMPARATOR CM-126/UR. - Frequency calibration of the transceivers is checked using Signal Comparator CM-126/UR and the following procedure to determine the accuracy of the 100-kc reference oscillator in the CV-731/URC. This is done by comparison of the internal and an external 100-kc standard.

1. Connect an external 100-kc signal (normal level, 1 volt rms) to CM-126/UR jack J2.

2 Turn GAIN control full counterclockwise.

3. Set FREQUENCY SELECTOR to the 100 KC position.

4. Adjust METER ZERO control for zero meter reading.

5. Turn GAIN control clockwise for noticeable meter deflection.

6. Clock the time required for the meter to make N complete cycles (a complete cycle is from maximum on one side to maximum on the other side and back to the original position); determine the frequency difference using the following relationship:

$$\text{Frequency difference} = \frac{10N}{T} \text{ parts per million}$$

Where frequency is 100 kc
T is time in seconds
N is number of complete cycles in T seconds

7. If the difference exceeds one part per million report this fact to cognizant maintenance personnel.

(b) CALIBRATION CHECK USING A TRANSMITTED FREQUENCY STANDARD. The following procedure is used to determine the accuracy of the transceiver operating frequency by comparing it to a transmitting station such as WWV.

1. Tune the receiver to 1 kc above the transmitting station frequency (WWV frequencies are 2.5, 5, 10, 15, 20, 25, and 30 mc).

2. Turn the SIDEBAND SELECTOR switch on the audio and control unit to LSB position.

3. Turn the RECEIVER R-F GAIN control on the sideband generator to clockwise end stop.

4. Turn the GAIN control to the counterclockwise stop.

5. Turn the FREQUENCY SELECTOR switch to the 1 KC position.

6. Turn the GAIN control on the frequency comparator clockwise for a reasonable meter deflection or an audible beat note from the speaker or dynamic handset.

Note

If the frequency difference is too great, the meter will read zero.

7. Clock the time required for the meter to make N complete cycles and determine the frequency difference using the formula noted in the calibration check using the CM-126/UR.

8. If the difference exceeds one part per million, report this fact to the cognizant maintenance personnel or refer to the reference oscillator adjustment procedure outlined in the maintenance section of this technical manual.

c. PREVENTIVE MAINTENANCE. - Periodically check cable connections, fuse holders and locks, and controls and indicators for dust and moisture, looseness, stripping, cracks, or other visible indications of possible damage. For specific information refer to Maintenance Standards Book, NAVSHIPS 93285.42(A).

d. EMERGENCY MAINTENANCE. - While equipment normally is maintained by technicians, it may be necessary for the operator to perform simple trouble shooting and repair during an emergency. The following information is provided for this purpose.

(1) PROCEDURE FOR SIMPLE REPAIR. - Emergency repair consists basically of locating and replacing a defective tube or blown fuse. In most cases, these faults can be determined by observation. However, before any attempt is made to repair equipment, be sure that the fault is not due to improper control settings. Table 3-5 lists the symptoms and probable causes of trouble as they would occur during normal operation. If, after replacing a blown fuse, the fuse blows again, have fault corrected before replacing fuse a second time.

The units containing tubes in the AN/URC-32( ) (when shipped) are Radio Frequency Amplifier AM-2061/URT, Converter-Oscillator CV-731/URC, Amplifier-Converter-Modulator AM-2064/URC, Converter-Monitor CV-730/URC, and Signal Comparator CM-126/UR. If it is necessary to check tubes, proceed as follows:

WARNING

Before attempting to remove or replace tubes, deenergize equipment by setting ON-OFF switch on Power Supply PP-2154/U to OFF.

(a) Energize equipment.

(b) On all units containing tubes except Radio Frequency Amplifier AM-2061/URT, remove front dust cover, and check that tube filaments glow; if no glow is seen, replace tube.

(c) To check tubes in Radio Frequency Amplifier AM-2061/URT, note the indication on the power amplifier PLATE CURRENT meter. If the PA tubes are operable, a normal indication is 150 ma.

TABLE 3-5. OPERATOR'S TROUBLE SHOOTING PROCEDURE

SYMPTOM	PROBABLE CAUSE
Indicator lamp on PP-2154/U does not light when ON-OFF switch is placed in ON position.	No primary power. Fuse F1 in PP-2154/U blown. Indicator lamp burned out. Transformer T1 in PP-2154/U open or shorted.
Inability to transmit.	F1 in AM-2061/URT blown or V1 and V2 or V3 or V4 burned out. F1 in PP-2153/U blown.
Difficulty in selecting operating frequency.	Check tubes in SMO in CV-731/URC.
Poor reception or transmission in CW or FSK modes.	Check tubes in CV-730/URC.

TABLE 3-6. SUMMARY OF OPERATING PROCEDURES FOR RADIO SET AN/URC-32( )

OPERATION	STEP	
	UNIT	CONTROL
General preliminary settings	Low-voltage power supply (PP-2154/U)	ON-OFF switch to OFF.
	Power amplifier (AM-2064/URT)	FIL OFF-TUNE-OPERATE switch to FIL OFF. PLATE switch to OFF.
	Sideband generator (AM-2064/URC)	RECEIVER RF GAIN control counterclockwise. EXCITER RF GAIN control counterclockwise. TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL.
	Frequency comparator (CM-126/UR)	FREQUENCY SELECTOR switch to OFF.
	CW and FSK unit (CV-730/URC)	XMIT-REC-CW TEST toggle switch to REC.
	Audio and control unit (AM-2062( )/URC)	MIC GAIN control counterclockwise.
Preliminary settings for single-sideband and AM voice operation	Sideband generator	SSB-AM toggle switch to desired mode of operation.
	CW and FSK unit	OSC CONTROL switch to OFF.
	Handset adapter (C-2691/URC)	HANDSET switch to LOCAL.
	Audio and control unit	SIDEBAND SELECTOR switch to desired sideband. On AM operation, set this switch to USB.

TABLE 3-6. (Continued)

OPERATION	STEP	
	UNIT	CONTROL
Preliminary settings for CW operation	Sideband generator	SSB-AM toggle switch to SSB. SIDETONE toggle switch to ON (this control is under the unit dust cover).
	CW and FSK unit	OSC CONTROL switch to CW 1KC or CW 1.5KC (1KC for even-numbered assignments, 1.5KC for 500-cycle increment assignment, (see paragraph 3-2d). OUTPUT control fully counterclockwise.
	Audio and control unit	SIDEBAND SELECTOR switch to USB.
Preliminary settings for teletypewriter FSK operation	Sideband generator	SSB-AM toggle switch to SSB. SIDETONE toggle switch to OFF (this control is under the unit dust cover).
	CW and FSK unit	OSC CONTROL switch to FSK. OUTPUT control fully counterclockwise. BFO control to center mark.
	Audio and control unit	SIDEBAND SELECTOR switch to USB.
	Handset adapter	HANDSET switch to LOCAL.
Turning on equipment **Note** If the equipment is to be used only as a receiver, perform only steps 1 and 2.	**Note** When using auxiliary equipment, such as an AN/BRA-13 on submarine installations, these equipments must be turned on. **CAUTION** Make the preliminary settings before performing the following steps. Failure to do so may result in damage to the power amplifier. EXCITER RF GAIN control must be fully counterclockwise. 1. LOW-VOLTAGE POWER SUPPLY: ON-OFF switch to the ON position. The red indicator lamp will light when air pressure is present in the cooling system. 2. SIDEBAND GENERATOR: Set meter selector switch to the -90, +130, and +250 positions; check that the meter reads between 35 and 50 db in each position. 3. POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Depress the PLATE switch to KEY. The PLATE CURRENT meter should indicate 150 ma of static current. Alternately depress PL NO. 1 TEST switch and PL NO. 2 TEST switch. The PLATE CURRENT meter should indicate between 60 and 90 ma of static plate current for each tube.	
Tuning procedure. (Cont)	1. POWER AMPLIFIER: PLATE switch to OFF. Set band switch to desired operating band. 2. FREQUENCY GENERATOR: Release DIAL LOCK. Set FREQUENCY CHANGE control and BAND CHANGE switch for 1 kc operating frequency. See decal instructions on dust cover for operation in the CW and FSK modes.	

TABLE 3-6. (Continued)

OPERATION	STEP
Tuning procedure. (Cont)	**Note** When setting up a frequency on any band, make certain the white index line on the last digit of the 15.7- to 30.0-mc frequency counter is centered in the window. 3. FREQUENCY GENERATOR: Reset DIAL LOCK and momentarily depress the OPERATE-TUNE switch to TUNE. If 0.1 kc tuning is applicable (AN/URC-32B models), set 0.1KC TUNE control to desired position. **Note** If a 1-kc operating frequency is to be used, set 0.1KC TUNE control to zero. 4. SIDEBAND GENERATOR: Adjust RECEIVER RF GAIN control for desired receiver output level (see audio level adjustments). On FSK operation, adjust BFO control on CW and FSK unit for proper operation of an external FSK converter. This completes tuning of the receiver portion. **CAUTION** Before performing the following steps, assure that a dummy antenna (DA-218/U) is connected to the dummy antenna connector of the associated antenna tuning device (AN/SRA-22 or CU-737/URC). When using an AN/BRA-13 or similar antenna tuner, set coupler control switch to the ON position and set TUNER BY-PASS switch to OFF. 5. ANTENNA TUNER: ANT-LOAD switch to LOAD. 6. POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to TUNE. 7. SIDEBAND GENERATOR: Set the meter selector switch to RF OUT EXCITER. TUNE-LOCAL-EXTERNAL CONTROL switch to TUNE. **Note** In the following steps, key to transmit by depressing the PLATE switch on the power amplifier to KEY. 8. SIDEBAND GENERATOR: With the EXCITER RF GAIN control in the maximum counterclockwise position, key to transmit and turn EXCITER RF GAIN control clockwise until the meter reads approximately 20 db. 9. POWER AMPLIFIER: Key to transmit, and adjust DRIVER TUNE control within the desired band limits to peak the PLATE CURRENT meter reading. Adjust the EXCITER RF GAIN control on the sideband generator as necessary to maintain a PLATE CURRENT meter reading of under 200 ma. The red index on the DRIVER TUNE control must fall within the proper band limits marked on the panel. If a power output reading is observed on the power output wattmeter of the associated antenna tuning control, detune the PA TUNE control until no power output is indicated. **Note** After completing step 9, make no adjustments on the DRIVER TUNE control for the remainder of the tuning procedure.

TABLE 3-6. (Continued)

OPERATION	STEP
Tuning procedure. (Cont)	10. POWER AMPLIFIER: Set PA TUNE control within the desired frequency band limits. Key to transmit, and adjust PA TUNE control for a dip in the PLATE CURRENT meter reading. 11. SIDEBAND GENERATOR: Set EXCITER RF GAIN control in the maximum counterclockwise position. 12. POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Key to transmit, turn the sideband generator EXCITER RF GAIN control clockwise until 500 watts of forward power is indicated on the antenna tuner wattmeter, and redip the power amplifier PLATE CURRENT meter reading, using the PA TUNE control. The PLATE CURRENT meter reading should not exceed 550 ma. **CAUTION** To prevent damage to antenna tuner, refer to operating instructions for the associated antenna tuning device (AN/SRA-22 or CU-737/URC) and follow the operating procedures step by step. Do not operate ANT-LOAD switch while AN/URC-32( ) is keyed to transmit. 13. POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to TUNE. 14. ANTENNA TUNER: ANT-LOAD switch to ANT, and adjust antenna tuning controls for minimum reflected power. For this procedure, see the operating instructions for the associated antenna tuner (AN/SRA-22 or CU-737/URC) and follow step by step. 15. POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Key to transmit, and adjust sideband generator EXCITER RF GAIN control for a forward power output of 500 watts. The reflected power should be less than 10 watts. The PLATE CURRENT meter reading should be between 450 and 550 ma. Adjust antenna tuner (AN/SRA-22 or CU-737/URC) as necessary. Key to transmit, and adjust sideband generator EXCITER RF GAIN control for a forward power output of 125 watts. 16. SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL. 17. POWER AMPLIFIER: PLATE switch to ON. This completes tuning procedure.
Receive audio level adjustment	1. SIDEBAND GENERATOR: Adjust RECEIVER RF GAIN control so that the agc does not increase the gain excessively between characters on CW and FSK mode and between words on SSB voice mode. This control normally is set so that the meter momentarily indicates about 15 db with the meter selector switch in the AGC-TGC position. If the dynamic handset, speaker or remote audio output is inadequate, adjust the SPEAKER gain control, located under the dust cover of the audio and control unit, for the desired output level.

TABLE 3-6. (Continued)

OPERATION	STEP
Voice transmit audio level adjustment	1. SIDEBAND GENERATOR: Set meter selector switch to AGC-TGC position. 2. HANDSET ADAPTER: HANDSET switch to LOCAL. Press the push-to-talk button on dynamic handset, and speaking at a normal level, adjust audio and control unit MIC GAIN control so that normal voice peaks read in the red area of the sideband generator meter. Do not readjust sideband generator EXCITER RF GAIN control. Set HANDSET switch to REMOTE for remote operation.
CW transmit audio level adjustment	1. CW AND FSK UNIT: METER MULTR switch to +8 DBM position. MONITOR switch to USB XMIT. 2. CW AND FSK UNIT: XMIT-REC-CW TEST switch to CW TEST. Adjust OUTPUT control on CW and FSK unit for 0 vu. Adjust EXCITER RF GAIN control on sideband generator for 500 watts forward power as indicated on the antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter. The PLATE CURRENT meter on the power amplifier must not exceed 550 ma. 3. HANDSET ADAPTER: HANDSET switch to REMOTE.
FSK transmit audio level adjustment	1. CW AND FSK UNIT: METER MULTR switch to +8 DBM position. MONITOR switch to USB XMIT. 2. CW AND FSK UNIT: Adjust OUTPUT control on CW and FSK unit for 0 vu. Adjust EXCITER RF GAIN control on sideband generator for 500 watts forward power as indicated on antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter. The PLATE CURRENT meter on the power amplifier must not exceed 550 ma. 3. HANDSET ADAPTER: HANDSET switch to REMOTE.
Transmit-receive operation	1. Key to transmit by depressing push-to-talk switch on dynamic handset. 2. In CW mode, the dynamic handset operates break in. The keying circuit has a delay which holds equipment in transmit between key-open intervals. Adjust CW KEYING RELEASE TIME control (under dust cover of CW and FSK unit) for desired break-in time. 3. In FSK mode, the equipment is keyed to transmit by a switch on the teletypewriter control panel (C-1004/SG or equivalent). **Note** When RCVR ANT OVERLOAD indicator on Interconnecting Box J-1007/U is lighted, press RCVR ANT RESET button. Indicator lights due to excessive r-f pick-up from a transmitter on the same or adjacent operating frequency.

TABLE 3-6. (Continued)

OPERATION	STEP
Independent-sideband operation	
Two remote inputs	1. AUDIO AND CONTROL UNIT: SIDEBAND SELECTOR switch to LOCAL OFF. Adjust USB and LSB LINE INPUT GAIN controls (under dust cover) so that the meter on the CW and FSK unit indicates 0 vu in the +8 DBM position for each sideband. 2. SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to TUNE. Adjust EXCITER RF GAIN control for 60 watts forward power as indicated on antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter. Set TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL. Readjust EXCITER RF GAIN as needed to keep TGC meter in red area.
One local, one remote input	1. SIDEBAND SELECTOR switch on the audio and control unit selects the sideband for the local handset signals and places remote signals on the remaining sideband. Set levels as outlined under two remote inputs.
Transmitting FSK on USB and remote audio on LSB (Cont)	1. Make general preliminary settings; set METER MULTR switch on CW and FSK unit to +8 DBM. 2. Turn on equipment. 3. Perform steps 1 through 10 of tuning procedure. Key to transmit (refer to note in step 7), and adjust EXCITER RF GAIN control for 60 watts forward power as indicated on antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter. 4. SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL. AUDIO AND CONTROL UNIT: SIDEBAND SELECTOR switch to LSB or LOCAL OFF. CW AND FSK UNIT: MONITOR switch to USB XMIT, OSC CONTROL switch to FSK. XMIT-REC-CW TEST switch to XMIT. Adjust OUTPUT control for an indication of 0 vu on the panel meter. Antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter will indicate approximately 250 watts forward power. OSC CONTROL switch to OFF. MONITOR switch to LSB XMIT. 5. Perform the audio input adjustment that applies: (a) If LSB audio signal is fed in through the junction box terminals, adjust LSB LINE INPUT GAIN control (under audio and control unit dust cover) for a peak indication of 0 vu on the CW and FSK unit panel meter. Antenna tuner (AN/SRA-22 or CU-737/URC) wattmeter will indicate approximately a peak of 250 watts forward power. (b) If LSB audio is fed into the audio and control unit from the ship's radio remote control system, adjust MIC GAIN control on the audio and control unit for a peak indication of 0 vu on the panel meter of the CW and FSK unit. Antenna tuner wattmeter will indicate approximately 250 watts of forward power.

TABLE 3-6. (Continued)

OPERATION	STEP
Transmitting FSK on USB and remote audio on LSB (Cont)	6. SIDEBAND GENERATOR: Meter selector switch to AGC-TGC. 7. With signal fed in on both sidebands, the panel meter on the sideband generator should indicate within the red area of the scale. If indication is greater than the red area of scale, adjust the EXCITER RF GAIN control for a correct indication. **Note** Antenna tuner (AN/SRA-22 or CU-737/URC) will not indicate 500 watts. However, 500 watts PEP is being transmitted as indicated by the indication in the red area of the meter.
Receiving FSK on USB and remote audio on LSB	**Note** The SIDEBAND SELECTOR switch on the audio and control unit determines which channel is fed locally on dynamic handset or fed out through remote outputs. 1. The USB position allows local reception of USB. LSB output is fed through terminals in the junction box and is controlled by the LSB LINE OUTPUT GAIN control on the audio and control unit. 2. The LSB position allows local reception of LSB. USB output is fed through terminals in the junction box and is controlled by the USB LINE OUTPUT GAIN control on the audio and control unit. 3. There is output on both sidebands through the junction box terminals when the SIDEBAND SELECTOR switch on the audio and control unit is set to LOCAL OFF. The output levels are adjusted as in steps 1 and 2 of this procedure.
Turning off equipment	1. POWER AMPLIFIER: PLATE switch to OFF. FIL OFF-TUNE-OPERATE switch to FIL OFF. 2. LOW-VOLTAGE POWER SUPPLY: ON-OFF switch to OFF.